
Space Weather Forecast

Issued on Wednesday 25 December 2024 at 00:13 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Further Moderate flares expected. G1/Minor Geomagnetic Storms likely 25-26 Dec.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate with several Moderate flares observed, mostly from the complex of spots near south centre disc. The peak flare was observed from this area at 24/0019 UTC.

There are now eleven sunspot regions on the visible disc. A region on the northeast limb is currently still too close to the limb for an accurate analysis. South centre disc remains of interest on the disc, containing a cluster of three of the larger regions on the disc. However, two of these appear to have undergone a reduction in magnetic complexity. A region in the northeast saw growth in recent hours, becoming the largest region on the disc, but so far with a reasonably simple magnetic layout. Other remaining regions are mostly smaller and simpler.

No Earth directed Coronal Mass Ejections (CMEs) were observed in solar imagery in the last 24 hours.

Solar Wind / Geomagnetic Activity: Solar winds showed a waning coronal hole fast wind connection. Wind speeds declined from strong levels, around 600 km/s, to elevated levels, near 500 km/s. The Interplanetary Magnetic Field was weak, with the north-south component varying weakly. Geomagnetic activity was Quiet to Unsettled (Kp1-3).

Energetic Particles / Solar Radiation: Energetic particles were well below the S1/Minor Radiation Storm threshold, but slightly elevated above normal background levels, on a slowly declining trend.

Four-Day Space Weather Forecast Summary

Solar Activity: Further Moderate flares are likely, with a slight chance of isolated Strong flares throughout.

Solar Wind / Geomagnetic Activity: A CME from 23 Dec may give a glancing blow at Earth on Day 1 or Day 2 (25-26 Dec), with some uncertainty in the timing of this feature. No other CMEs currently feature in the forecast, although confidence in this aspect of the forecast is lower than

usual. Solar winds are elevated but slowly declining due to a waning coronal hole fast wind. However, there is also the possibility of some further fast wind activity later in the period.

Geomagnetic activity is expected to be mainly Quiet to Unsettled at first. Later Day 1 into Day 2, peak G1-G2/Minor-Moderate Storm levels are possible, with a slight chance of G3/Strong Storm intervals, due to potential CME influence. By Days 3 and 4 (27-28 Dec), mainly Quiet to Unsettled activity is forecast, but with lower confidence given the uncertainty in the CME forecast.

Energetic Particles / Solar Radiation: There is a slight chance of Solar Radiation storms occurring during the period. In the absence of any further notable flares, ongoing slightly enhanced Solar Radiation counts should ease towards normal background levels in the coming days.

Geomagnetic Storms

Geomagnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	50	60	10	5
Strong	G3	No	5	10	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 (M Class)	Yes	80	80	80	80
Very Active	R3-R5 (X Class)	No	10	10	10	10

Solar Radiation Storms (High Energy Protons)

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	10	10	15	15
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = cm ⁻² sr ⁻¹ s ⁻¹)						